

Tumor Response Evaluation Transarterial Chemoembolization-treated Hepatocellular Carcinoma

Juferdy Kurniawan

Division of Hepatobiliary, Department of Internal Medicine, Faculty of Medicine
Universitas Indonesia/Dr. Cipto Mangunkusumo General National Hospital, Jakarta

Transarterial chemoembolization (TACE) is the standard of care for patients with intermediate stage hepatocellular carcinoma (HCC), as recommended by Barcelona Clinic Liver Cancer (BCLC) 2016 staging system. Data showed that patients treated with conventional TACE had longer median survival time (18-28,7 months) compared to those who did not (9,2-19,7 months).¹ However, the clinicians have to select carefully which of their patients are suitable for undergoing TACE.²

The efficacy of TACE procedure can be assessed by radiologic response, biologic response (alpha-feto protein), degree of mass necrosis, as well as patient's survival and quality of life.^{3,4} Among them, radiologic response assessment plays the central role in the evaluation of treatment success following TACE. According to modified response evaluation criteria in solid tumors (mRECIST) or European Association for the Study of the Liver (EASL) criteria, response of TACE is classified into either complete response, partial response, progressive lesion, or stable lesion.^{5,6,7} This criteria keeps the concept of measuring the viable part of residual tumor tissue and recommended the uni-dimensional assessment of the longest viable tumor diameter in order to determine the category.² Shim et al demonstrated a clear prognostic survival between the first two criterias (with each HR 1 and 2,75, $p < 0,001$) and the rest ones (HR 6,32 and 16,06, $p < 0,001$).⁸

Abdominal multiphasic CT scan or MRI is the common modality used, usually performed 4 weeks after TACE. Aside from CT scan and MRI, contrast-enhanced ultrasonography (CEUS) is now recognized as a useful imaging tool for evaluating immediate response after TACE. It facilitates real-time vascular phase imaging of high resolution, thus is more effective for showing feeding artery than contrast-enhanced CT or MRI. The use of CEUS is also relatively safer since it can be used without risk of nephrotoxicity or ionizing radiation.^{9,10,11} Nevertheless, it remains difficult for CEUS to exhibit comprehensive assessment of the whole liver parenchyma during the short duration of the arterial phase. Similar to basic US, poor acoustic window or deep seated lesion results in poor imaging. In addition, CEUS is inferior in case of multiple lesions or very large tumor, since they usually can't be captured on single plane.^{9,11,12}

Radiologic evaluation response can be very helpful for the context of follow up and identifying the need of retreatment. A lack of objective radiologic response after the first TACE session should not automatically abandon further TACE treatments. Georgiades et al showed that second TACE improved the response found in 47% patients with initial unsatisfactory result.¹³ Therefore, patients with viable tumor tissue detected can be considered for retreatment with precaution of their clinical tolerance 6-8 weeks after evaluation.¹⁴ However, the decision for retreatment should not only be taken based on the radiological response as TACE may become a double-edged sword for liver function. In this context, objective radiologic tumor response, impairment of liver function, and liver damage after the first TACE session are integrated into the system of the assessment for retreatment with TACE (ART score).^{1,15}

TACE is currently the mainstay palliative liver-directed treatment modality for intermediate stage HCC. Tumor response evaluation may be the best indicator for further treatments need to be taken following TACE.

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